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Research Letter

Robot-assisted excision of a symptomatic deep infiltrating cervical endometrioma

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Endometriosis is a common gynecological condition in which endometrial cells are present outside the uterine cavity. Endometriosis commonly occurs in the ovaries, pelvis, and uterine myometrium. In addition, endometriosis also occurs rarely in the bowel, cervix, and even the lungs, and it can sometimes cause abdominal pain, vaginal bleeding, or hemoptysis [1]. Patients with symptoms of endometriosis are treated with analgesics, hormones, surgery, or a combination of these modalities. Cervical endometriosis, an uncommon condition with mild symptoms and rare complications, does not usually require surgical treatment. Cervical endometriosis symptoms that warrant surgical intervention have been rarely reported.

Patients with endometriosis are usually treated using laparoscopy or laparotomy. Because of dense adhesions of deep, infiltrating endometriosis, it is extremely difficult to perform laparoscopy in these patients. Minimally invasive techniques such as robot-assisted surgery have been widely used in gynecological surgery over the past few years. Robot-assisted surgery has numerous advantages such as three-dimensional imaging, tremor filtration, fixed instruments, and a comfortable set up for surgeons. Complicated robot-assisted gynecological operations have been recently reported [2,3], although robot-assisted surgery for endometriosis is rare. We present a case of deep cervical endometriosis with severe pelvic pain that was successfully managed using robot-assisted surgery.

A 35-year-old woman was referred to Tri-Service General Hospital for severe dysmenorrhea and persistent pelvic pain during her latest menstrual period. Her menstrual periods were regular, and she did not use oral contraceptives. Primary dysmenorrhea was managed with analgesics, since her teenage years. The symptoms started to worsen 5 years prior to presentation, and the pain quality differed from that experienced previously. Specifically, pain was experienced in the mid-lower abdomen, radiated to her lower back, and was associated with rectal pain and diarrhea. Defecation aggravated these symptoms. She also experienced severe dyspareunia deep in the vagina upon pushing the cervix. The pain became intolerable and was refractory to analgesics; therefore, she was referred for further evaluation and management. The patient denied smoking, drinking alcohol, and being exposed to risky substances at work.

The only abnormality revealed by bimanual examination was an approximately 2-cm nodular mass between the posterior lip and cul-de-sac with severe tenderness on palpation. Digital examination through the anus confirmed a tender mass, approximately 2–3-cm wide, at the lower uterine level. The cul-de-sac and rectum were soft and the rectal mucosa was intact, suggesting that endometriosis of the pelvic floor was unlikely. Transvaginal pelvic sonography showed a well-demarcated mass with hypoechoic homogenous content at the posterior cervix, suggestive of an endometrioma (Fig. 1A). Another cyst suggestive of an endometrioma was noted over the left ovary. Magnetic resonance imaging (MRI) showed cystic tumors of the cervix and left ovary (2 cm and 3 cm in diameter, respectively; Fig. 1B). Peripheral blood cell count indicated low hemoglobin (11.4 g/dL). The serum biochemistry level was normal. We performed robot-assisted excision of the deep pelvic endometriosis of the left ovary and cervix. Multiple widespread brown spots were identified on and excised from the pelvic peritoneum. The approximately 3-cm endometrioma on the left ovary was enucleated, and we sutured the incision. We made a vertical incision at the lower posterior portion of the uterus. Chocolate-like contents were observed in the cystic lesion (Fig. 1C). The pseudocapsule was completely excised using a robotic speculum. The deep cervical space was sutured using 2-0 MONOCRYL (Ethicon, San Angelo, TX, USA). Pathological examination confirmed that these were endometriosis lesions. We administered postoperative hormone therapy with a gonadotropin-releasing hormone agonist (Leuplin Depot, Takeda Pharmaceuticals,

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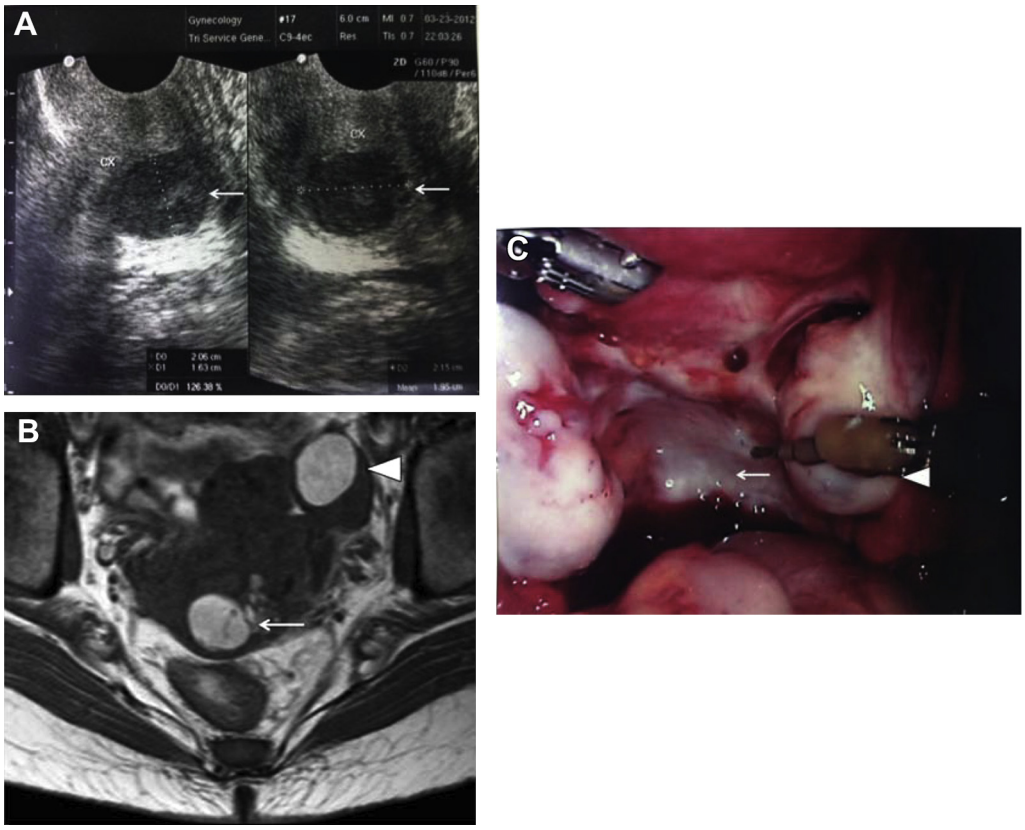

Fig. 1. (A) Transvaginal sonogram of an endometrioma deep in the cervical stroma (arrow). (B) Magnetic resonance image of cervical endometriosis (arrow) and the endometrioma of the left ovary (arrowhead). The cervical tumor was on the sigmoid colon. (C) Pelvic view during the operation: cervical endometriosis prior to incision (arrow; as in A and B) as well as the endometrioma of the left ovary (arrowhead; as presented in B).

Osaka, Japan). The patient recovered well and was discharged on the postoperative Day 3. The pelvic and rectal pain was considerably alleviated 1 week postoperation. The keyword phrase "cervical endometriosis" was used to search the PubMed database for English language reports related to cervical endometriosis published between 1980 and 2011. A total of 26 papers were retrieved. In these reports, most patients with cervical endometriosis were asymptomatic, and their conditions were detected incidentally on histological examination. In 2011, Wang and colleagues [4] described a series of 33 cases of cervical endometriosis. Most patients (28 of 33; 84.8%) were asymptomatic. A few (5 of 33; 15.1%) had superficial lesions with vaginal bleeding (including intermenstrual bleeding, postcoital spotting, and massive vaginal hemorrhage). Instead of bleeding, symptoms in the present case of cervical endometriosis that was located deeply within the stroma of the posterior portion of the cervix included mid-lower abdominal pain radiating to the lower back, diarrhea, pain on defecation, and dyspareunia. The pain could be induced on pelvic examination and was compatible with the patient's chief complaints, suggesting the causal role of the cervical lesion.

Classic images of endometriotic masses on ultrasonography are cystic lesions with diffuse increased internal echogenicity. Deep infiltrating endometriosis, other than endometriotic lesions, may present as nodular formations or irregularly shaped hypoechoic retractable lesions on the uterine surface, uterosacral ligament, vagina, pouch of Douglas, vesicouterine pouch, or bowel loops [5]. Lesions of deep infiltrating endometriosis usually demonstrate hypointense signals on T2-weighted MRI [6]. In our case, sonography indicated that the cystic ovarian tumor was a typical endometrioma. However, a well-encapsulated and deep cervical lesion with low echogenicity is challenging to diagnose using sonography. The T2-weighted MRI revealed a high signal for this mass compatible with the MRI findings of endometriosis and suggestive of endometrioma. The tumor location may explain the mid-lower abdominal and rectal pain that radiated to the lower back as well as the dyspareunia. Prior to surgical intervention, we suspected that this lesion was a symptomatic cervical endometrioma.

Because the lesion was deep within the cervix, laparoscopic surgery would have been very challenging. The vaginal approach was not appropriate because of the concomitant endometrioma of the left ovary. Vaginal surgery for such a deep cervical lesion may jeopardize a woman's ability to conceive, especially if she is nulliparous. Because gynecological surgeons are increasingly using robotic systems to perform hysterectomy, myomectomy, tubal reanastomosis, and cancer staging [7], severe endometriosis can also be managed using robot-assisted surgery [8].

Our group presented the first series of robot-assisted gynecologic surgery: 60 cases of complicated gynecologic diseases, including those complicated by obesity, severe adhesive diseases, a large uterus, or an obliterated cul-de-sac [3]. To our

knowledge, this is the first report of the successful treatment of symptomatic deep cervical endometriosis using robot-assisted surgery. Robotic systems provide highly precise instruments and three-dimensional imaging that facilitate access to difficult lesions as in the case presented here. Postoperative recoveries are also improved because of the delicate dissection and suturing techniques facilitated by robotic systems. The development of robot-assisted surgery has made it possible to operate on deep pelvic lesions, further expanding the possibilities for gynecological surgery in this era of minimally invasive surgery.

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